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Abstract

Factors of Safety, Hygiene and Economy in Locating Different Types of Large Thermal Power Stations in Sweden

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Savings in capital costs with larger sizes are greater for nuclear units than for conventional ones. Also the existing trend towards very large thermal stations makes the choice between the two energy sources largely dependent upon the factors of hygiene and safety.

Thus, when or even before nuclear power is competitive it is a prime requisite for a country to analyse and to determine on equal terms the public health and safety criteria for alternative generating sources. The use of fossile fuels has been accompanied by a regrettable toll in lives beside damage and nuisance to the surroundings. In the nuclear industry on the other hand the siting and safety criteria used are sometimes overambitious and arbitrary.

In Sweden thermal power stations will for load reasons within the next 10 - 15 years be located in the south. Underground nuclear stations located in the inland is however desirable from a strategic view point. The scarcity of inland recipients large enough for stations of 1 000 Mw elect. capacity and the additional capital cost of building an underground station makes the possibility of inland location rather remote. Large conventional stations must be situated at the coast, due to transport facilities as all fossile fuel in Sweden is imported.

Preliminary surveys show that there are in all about 10 - 15 sites along the coastland of southern Sweden that could provide the necessary harbour, transportation and cooling water for large thermal power stations. A coal fired

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station of 2 000 Mw elect. requires about 150 000 m^2 storing area for the coal and almost the same area for the ash. For an oil fired station the harbour must accommodate ships of 50 000 - 60 000 t delivering about 2.5 Mt oil per year or one shipload per week. About a third of the yearly consumption must be stored according to authority regulations. The dust, noise, water contamination and fire hazards of all this handling must not be overlooked. The problem of transport and storing at a nuclear station seems on the other hand to be comparatively small.

The nuclear siting practice applied hitherto in Sweden has in principle emphasized the importance of the distance factor. For future large nuclear stations, with units in excess of 500 Mw elect., difficulties in siting may arise even at low populated Swedish coastland. It is of prime importance that this obstacle will be overcome by using inherently safe reactors and consequence limiting safeguards.

Oil and coal-fired stations lack practical means of reducing air pollution through combustion nuclei and oxides of sulphur and nitrogen. In comparison the radiation dose to the public from a nuclear station is negligible and always predictible and in the hands of the operator even in the case of a major incident.

In spite of the unavoidable discharge from a nuclear station to the water recipient, the main factor influencing the recipient will be the temperature increase of the cooling water, which is common to all types of stations.